CLAIMS

1. A noise suppressing circuit comprising: a common mode noise suppressing means for suppressing common mode noise propagating through a first conductor line and a second conductor line with identical phases; and a normal mode noise suppressing means for suppressing normal mode noise transmitted through the first and second conductor lines and creating a potential difference between the conductor lines, wherein:

the common mode noise suppressing means comprises a first detection/injection section and a second detection/injection section that are connected to the first and second conductor lines at different points and connected to each other through a path different from the first and second conductor lines, and that each perform detection of a signal corresponding to common mode noise or injection of an injection signal for suppressing common mode noise;

when the first detection/injection section performs the detection of the signal corresponding to the common mode noise, the second detection/injection section injects to the first and second conductor lines the injection signal generated based on the signal detected;

when the second detection/injection section performs the detection of the signal corresponding to the common mode noise, the first detection/injection section injects to the first and second conductor lines the injection signal generated based on the signal detected;

at least one of the first and second detection/injection sections incorporates two windings inserted to the first and second conductor lines and coupled to each other so as to produce a leakage inductance; and

the normal mode noise suppressing means incorporates at least one

capacitor for a normal mode having an end connected to the first conductor line and the other end connected to the second conductor line, and reducing normal mode noise in cooperation with the leakage inductance produced by the two windings.

2. The noise suppressing circuit according to claim 1, wherein:

the first detection/injection section incorporates: a first winding inserted to the first conductor line at a specific first point; a second winding that is inserted to the second conductor line at a point corresponding to the first point and that suppresses the common mode noise in cooperation with the first winding; and a third winding coupled to the first and second windings;

the second detection/injection section incorporates: a first capacitor for a common mode having an end connected to the first conductor line at a second point different from the first point and having the other end connected to one of ends of the third winding; and a second capacitor for the common mode having an end connected to the second conductor line at a point corresponding to the second point and having the other end connected to the one of the ends of the third winding; and

the first and second windings are coupled to each other so as to produce a leakage inductance.

3. The noise suppressing circuit according to claim 2, wherein the common mode noise suppressing means further incorporates a third capacitor for the common mode having an end connected to the one of the ends of the third winding and having the other end grounded.

4. The noise suppressing circuit according to claim 1, wherein the normal mode noise suppressing means incorporates two capacitors as the capacitor for the normal mode that are located at positions that sandwich the two windings coupled to each other so as to produce the leakage inductance.

5. The noise suppressing circuit according to claim 1, further comprising a magnetic core around which the two windings coupled to each other so as to produce the leakage inductance are wound, wherein the core incorporates: a first magnetic path forming portion that forms a magnetic path allowing a magnetic flux for coupling the two windings to each other to pass; and a second magnetic path forming portion that forms a magnetic path allowing a leakage flux produced by each of the two windings to pass.

6. The noise suppressing circuit according to claim 5, wherein the second magnetic path forming portion includes a portion made of a high-permeability magnetic material and a portion made of a magnetic material having high saturation flux density, and forms a closed magnetic path.

7. A noise suppressing circuit comprising: a common mode noise suppressing means for suppressing common mode noise propagating through a first conductor line and a second conductor line with identical phases; and a normal mode noise suppressing means for suppressing normal mode noise transmitted through the first and second conductor lines and creating a

potential difference between the conductor lines, wherein:

the common mode noise suppressing means comprises: a first detection/injection section and a second detection/injection section that are connected to the first and second conductor lines at different points and connected to each other through a path different from the first and second conductor lines, and that each perform detection of a signal corresponding to common mode noise or injection of an injection signal for suppressing common mode noise; and a peak value reducing section that reduces a peak value of the common mode noise and is provided on the first and second conductor lines between the first and second detection/injection sections;

when the first detection/injection section performs the detection of the signal corresponding to the common mode noise, the second detection/injection section injects to the first and second conductor lines the injection signal generated based on the signal detected;

when the second detection/injection section performs the detection of the signal corresponding to the common mode noise, the first detection/injection section injects to the first and second conductor lines the injection signal generated based on the signal detected;

at least one of the first and second detection/injection sections and the peak value reducing section incorporates two windings inserted to the first and second conductor lines and coupled to each other so as to produce a leakage inductance; and

the normal mode noise suppressing means incorporates at least one capacitor for a normal mode having an end connected to the first conductor line and the other end connected to the second conductor line, and reducing normal mode noise in cooperation with the leakage inductance produced by

the two windings.

8. The noise suppressing circuit according to claim 7, wherein:

the first detection/injection section incorporates: a first winding inserted to the first conductor line at a specific first point; a second winding that is inserted to the second conductor line at a point corresponding to the first point and that suppresses the common mode noise in cooperation with the first winding; and a third winding coupled to the first and second windings;

the second detection/injection section incorporates: a first capacitor for a common mode having an end connected to the first conductor line at a second point different from the first point and having the other end connected to one of ends of the third winding; and a second capacitor for the common mode having an end connected to the second conductor line at a point corresponding to the second point and having the other end connected to the one of the ends of the third winding;

the peak value reducing section incorporates: a fourth winding inserted to the first conductor line at a third point located between the first and second points; and a fifth winding that is inserted to the second conductor line at a point corresponding to the third point and coupled to the fourth winding and that reduces the peak value of the common mode noise between the first and second points in cooperation with the fourth winding; and

at least one of a pair of the first and second windings and a pair of the fourth and fifth windings are coupled to each other so as to produce a leakage inductance.

9. The noise suppressing circuit according to claim 8, wherein the common mode noise suppressing means further incorporates a third capacitor for the common mode having an end connected to the one of the ends of the third winding and having the other end grounded.

10. The noise suppressing circuit according to claim 7, wherein the normal mode noise suppressing means incorporates two capacitors as the capacitor for the normal mode that are located at positions that sandwich the two windings coupled to each other so as to produce the leakage inductance.

11. The noise suppressing circuit according to claim 7, further comprising a magnetic core around which the two windings coupled to each other so as to produce the leakage inductance are wound, wherein

the core incorporates: a first magnetic path forming portion that forms a magnetic path allowing a magnetic flux for coupling the two windings to each other to pass; and a second magnetic path forming portion that forms a magnetic path allowing a leakage flux produced by each of the two windings to pass.

12. The noise suppressing circuit according to claim 11, wherein the second magnetic path forming portion includes a portion made of a high-permeability magnetic material and a portion made of a magnetic material having high saturation flux density, and forms a closed magnetic path.